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COMMERCIAL TURKESTAN ALFALFA SEED.

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INTRODUCTION.

The United States does not produce enough alfalfa seed to supply the domestic demand for seeding purposes. The United States census report gives the production for the year 1909 as 15,799,680 pounds. During the year previous to July 1, 1910, 2,891,685 pounds, or a little more than one-sixth of the domestic crop, was imported. In 1913 the importation had increased to 6,000,000 pounds and the domestic production was approximately twice what it was in 1909. As imported seed is usually sold in this country on the basis of appearance without reference to the place of origin, Turkestan seed, which is the lowest priced alfalfa seed in the European markets, is the type now chiefly imported.

SOURCE OF SURPLUS ALFALFA SEED.

France, Italy, and Russian Turkestan each normally produce an excess of alfalfa seed over that required for domestic use and together furnish most of the seed entering into international trade. The French seed comes from Provence, in the lower Rhone Valley, and from Poitou, in west-central France. The provinces of Bologna and Modena, on the south side of the Po Valley, furnish most of the Italian seed. Commercial Turkestan seed comes from the southern part of Asiatic Russia, south and east of the Sea of Aral, including the provinces of Khiva, Bokhara, and Samarkand. The altitude of this region varies from nearly sea level in northern Khiva to 2,500 feet at Samarkand. The summers are hot, with an average maximum temperature for July of approximately 100° F., while the winters are cold, with an average minimum temperature for January of approximately zero. The rainfall is light and all the alfalfa culture is under irrigation. Generally speaking, the summer temperature approximates that of southwestern Arizona and southeastern Cali-

Note.—This bulletin is intended to warn American alfalfa growers to avoid the use of commercial Turkestan seed, which, though inferior to domestic-grown seed, is retailed at a higher price, making greater profits for the dealers. The bulletin tells how this cheapest of all alfalfa seeds in the European market can be identified.

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fornia, while the winter temperature approximates that of North Dakota, South Dakota, western Minnesota, and eastern Montana.

Of the three principal countries producing alfalfa seed for export, Russian Turkestan contributes the greatest part. Most of this Turkestan seed goes directly to Hamburg or to one of the other German ports, where it is cleaned and graded before being exported to the United States, South America, or other countries.

Although a surplus of Turkestan seed is constantly available on the European market, it is looked upon with disfavor, and comparatively little of it is purchased by European farmers. This discrimination results in making Turkestan seed the lowest priced seed which enters into international trade. The German price of Provence seed, as quoted in Berlin, is from 25 to 50 per cent higher than that of Turkestan, with Italian seed intermediate in price. The wholesale price of Turkestan seed in the United States is based upon the European price and is invariably lower, often 2 cents per pound less, than that of domestic seed, while the retail price of Turkestan seed in this country is usually higher than that of domestic seed. Thus, the cheapest alfalfa seed in Europe is brought to this country and is sold in competition with domestic seed, and usually at a higher price. Both the wholesale and retail seed dealers make a larger profit on Turkestan seed than on domestic seed, with the result that more and more of this seed is imported each year, until now practically all the imported seed is from that source. Over 95 per cent of the alfalfa seed received since July 1, 1913, came from Turkestan.

On the basis of the amount of alfalfa seed imported in the past nine years it seems a conservative estimate to assume that one-tenth of the 5,000,000 or more acres of alfalfa now growing in this country was planted with commercial Turkestan seed.

EUROPEAN ESTIMATE OF COMMERCIAL TURKESTAN ALFALFA.

In the alfalfa-growing regions of Europe alfalfa seed that is locally grown is generally preferred. When local seed can not be obtained, Provence or other French seed is considered best, with Italian seed second, while commercial Turkestan seed is the least desired.

The results obtained by European investigators who have tested Turkestan alfalfa in comparison with other varieties have shown it to be decidedly inferior. In most instances it was found to be the poorest variety tested, giving a hay production ranging from 24 to 80 per cent of that of the best variety in each locality. It is recognized as being slow to start into growth after the first cutting, thus reducing the hay yield from subsequent cuttings.

Gyárfás (4, 5)[1], reviewing the tests made at the Royal Hungarian Experiment Station at Magyarovar in 1909–11, found that Turkes-

[1] The figures in parentheses refer to "Literature cited" at the end of this bulletin.

tan alfalfa was less resistant to cold and drought, that its growth was slower, that its season of growth was shorter, and that it yielded less hay and was more quickly crowded out by weeds and grass than the Hungarian alfalfa with which it was compared. The results of the next year's tests showed the Turkestan to be inferior to the Hungarian alfalfa from every point of view.

Hansen (6, p. 409), after testing alfalfas of various origins in Denmark, says of the two lots of Turkestan used that they were similar and both poor, that the larger part of the annual yield was from the first cutting, the second cutting being small; and that it was especially to be noted that the growth after cutting was weak and slow, so that the stand was injured by grass and weeds.

Hiltner (7) found in a 3-years' test in Bavaria that Turkestan alfalfa gave the lowest yield of the varieties tested and only about one-half the yield of the best variety. Following these results, he says that the culture of Turkestan alfalfa can not be recommended.

In variety tests made by Lemmermann and Liebau (9, p. 407–411) at the Agricultural High School at Dahlem, Germany, Turkestan alfalfa yielded 70 per cent as much hay as German alfalfa.

Denaiffe (2), referring to a 6-years' test made by Stebler at Zurich, says that Turkestan alfalfa is short lived and not productive. The yield was approximately 70 per cent of that of Provence alfalfa and not as high as Spanish.

Todaro (10, p. 138), at the Agricultural High School at Bologna, Italy, found Turkestan alfalfa to yield about one-third as much as alfalfa from Hungary, Provence, and Argentina, and one-fourth as much as Italian. He says that in consequence of the inconsiderable value of Turkestan lucern, mixing it with home-grown lucern comes to be pure fraud.

Witte (12), testing alfalfa in Sweden, says that Turkestan, which yielded approximately three-fourths as much as Hungarian alfalfa, is the poorest variety tested in Sweden.

Of all the reports of European investigators, none have been found that speak favorably of the Turkestan seed. They are unanimous in their verdict that European seed, and locally grown seed especially, is more productive.

COMPARATIVE VALUE OF TURKESTAN ALFALFA IN THE UNITED STATES.

Turkestan alfalfa has been grown in the United States for about 15 years, and the following statements as to its value are based on comparative tests and observations made under widely varying climatic and soil conditions.

Freeman (3, p. 193) says that "where there is a sufficient supply of moisture and the winters are not extremely cold, lack of productivity

renders the Turkestan variety much inferior to the ordinary sort. It has therefore proven a failure in the Central States and the States of the Middle West."

Kennedy (8, p. 29) found that none of the Turkestan strains tested in southeastern Nevada were as valuable as the domestic strains of alfalfa.

Brand and Waldron (1, p. 46), after reviewing the available experiments where Turkestan alfalfa seed was tested for hardiness, say that "it is apparent * * * that while none of the Turkestan strains in their present condition are hardy enough for the cold Northwest, several of them are promising for acclimatization by selective breeding methods."

Westgate (11, p. 37), referring to certain strains of alfalfa introduced from Turkestan by the United States Department of Agriculture, says that "Turkestan alfalfa was introduced into the United States in 1898 and has since been tried in all parts of the country. It has been found to be superior to the ordinary alfalfa in only limited sections. It is decidedly inferior in the humid sections east of the Mississippi River, but has given somewhat better results than the ordinary alfalfa in the semiarid portions of the Great Plains and in the Columbia Basin."

The results of comparative tests in the United States of commercial Turkestan with other strains of alfalfa have shown it to be decidedly inferior in most sections and of only doubtful value in the localities most favorable to it.

COMMERCIAL TURKESTAN ALFALFA NOT ADAPTED TO GENERAL USE IN THE UNITED STATES.

Commercial Turkestan alfalfa should not in any way be confused with the special strains of hardy alfalfas developed from certain introductions of alfalfa seed from Turkestan made by the United States Department of Agriculture. Some of these strains have proved hardy in the upper Mississippi Valley and are evidence that valuable varieties of alfalfas exist in Central Asia, but for the present none of these can be said to have passed the stage of being of use in experimental work in selection and breeding.

Commercial Turkestan seed of promiscuous origin is not adapted to general use in the United States. It is particularly unsuited to the humid climate of the East. It is not sufficiently hardy to warrant its general use in the upper Mississippi Valley, where hardiness is a limiting factor in alfalfa production. It is slow to recover after cutting, and gives inferior yields of hay, even when it does not suffer from drought or winterkilling. It has a tendency to be short lived, making it undesirable where alfalfa is wanted in long rotations, and it is also a poor seed producer

HOW COMMERCIAL TURKESTAN ALFALFA SEED CAN BE IDENTIFIED.

In view of the facts already set forth, it appears necessary to warn alfalfa growers to avoid the use of commercial Turkestan seed. Seed from this source has nothing to recommend it for general use in this country.

Fortunately, commercial Turkestan alfalfa seed can be identified by the presence of the seeds of Russian knapweed (*Centaurea picris*), shown in figure 1. These seeds are believed to be always present in commercial Turkestan seed and have not been found in commercial seed from other sources. Russian knapweed is a pernicious weed in the Crimea and in other parts of southern European Russia, but there is at the present time no alfalfa seed produced in these sections for export. In manner of growth, Russian knapweed is similar to quack-grass, Johnson grass, and the Canada thistle, being a perennial, spreading both by seed and underground rootstocks. The seeds of Russian knapweed are slightly larger than those of alfalfa and can not all be removed by any practicable method of machine cleaning. The chalky-white color makes them especially conspicuous, and their symmetrical form, being slightly wedge shaped, serves to distinguish them from the notched seeds of other species of Centaurea, which often occur in Italian and other alfalfa seed. As the seeds of Russian knapweed are not usually abundant, a small trade sample should never be used to determine whether the seed is commercial Turkestan alfalfa. It may often happen that a number of small samples, such as are usually supplied by the trade, would contain none of these seeds, while an examination of the bulk will show them to be present. If any seeds of Russian knapweed occur, the alfalfa seed is wholly or in part from Turkestan.

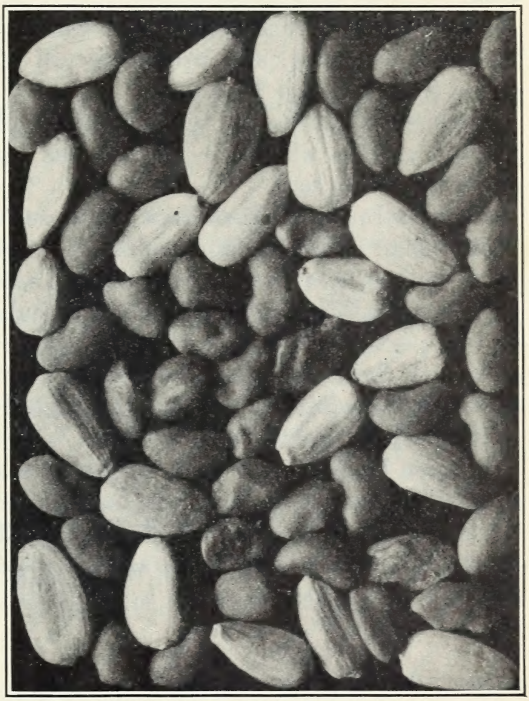

FIG. 1.—Seeds of Russian knapweed mixed with alfalfa seeds. (Magnified five diameters.) This sample shows a much larger proportion of the weed seeds (distinguished by their lighter color and their symmetrical form) than is ordinarily found in Turkestan alfalfa seed.

SUMMARY.

Russian Turkestan produces the largest supply of alfalfa seed for export.

Turkestan alfalfa seed is distributed into international trade through Germany, chiefly through the port of Hamburg.

Turkestan alfalfa has given uniformly poor results wherever tested in Europe, and none of the tests of commercial Turkestan seed in this country has given as good yields as were obtained from local seed.

Approximately one-fifth of the alfalfa seed used in the United States is imported, and practically all of this imported seed now comes from Russian Turkestan.

Commercial Turkestan is the cheapest alfalfa seed in the European market, and its wholesale price in this country is less than that of domestic-grown seed.

The retail price of Turkestan alfalfa seed in this country is usually higher than that of domestic seed; consequently, the seedsman's profit on it is greater than on domestic seed.

Commercial Turkestan alfalfa is particularly unsuited to the humid eastern portion of the United States, while it is not as hardy as other strains in the North and everywhere recovers slowly after cutting, thus reducing the hay yield. It is relatively short lived and is a poor seed producer.

Russian knapweed, a weed similar in manner of growth to quackgrass, Johnson grass, and the Canada thistle, is constantly being introduced in Turkestan alfalfa seed, and by the presence of this weed seed commercial Turkestan seed may be easily identified.

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